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ABSTRACT

This booklet summarizes the proceedings of a forum on the state of federal information policies as they relate to aiding American competitiveness in industrial and information markets at home and abroad. Speakers whose remarks are summarized include Librarian of Congress James H. Billington; New York Congressman Sherwood Boehlert, the keynote speaker; and Dr. Richard Rowberg, chief of the Science Policy Research Division, Congressional Research Service (CRS), Library of Congress. Panelists for the morning session, which focused on the collection and dissemination of foreign scientific and technical information, included Dr. Christopher T. Hill, senior specialist in Science and Technology, CRS; Barry C. Beringer, associate under secretary for economic affairs, Department of Commerce; Charles T. Owens, head of the Information and Analysis Section, Division of International Programs of the National Science Foundation; and Dr. Michael Maccoby, director of the Project on Technology, Work, and Character in Washington, DC. Richard Simons, director of International Affairs and general counsel of Dialog Information Services, Inc., presided over the afternoon session, which considered the development of policies to enhance competitiveness of the U.S. information product. Afternoon speakers included Dr. Peter Hernon, professor at the Graduate School of Library and Information Science of Simmons College, Boston, Massachusetts; Marvin I. Weinberger, senior vice president for marketing and corporate development of Telebase Systems; Patrick Gibbins, managing director of Archetype Systems in London; and Dr. Herbert R. Brinberg, president and chief executive officer of Wolters Samsom U.S. Corporation. (EW)

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FEDERAL INFORMATION POLICIES

THE IMPACT ON COMPETITIVENESS

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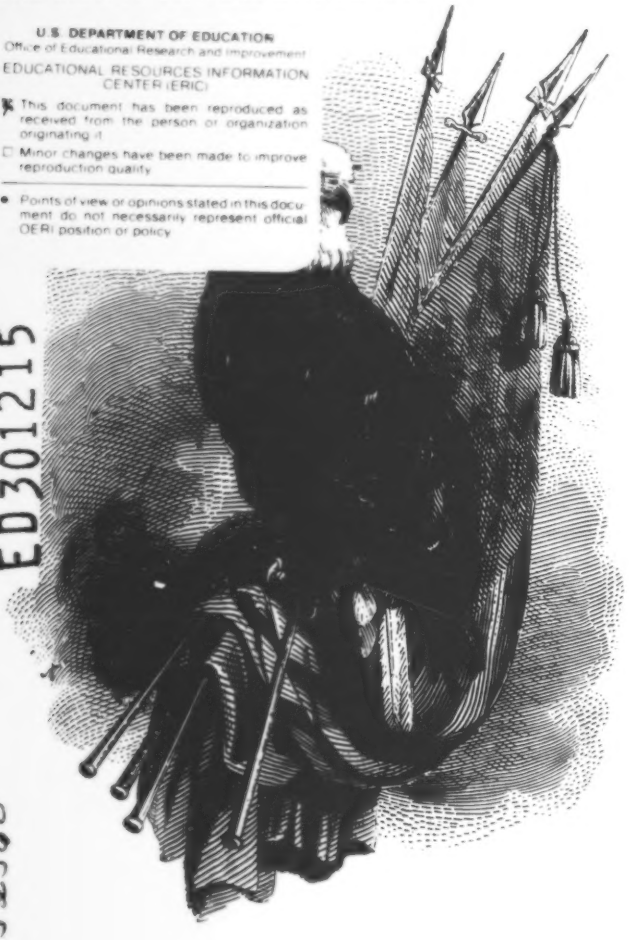

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FLICC

Federal Library & Information Center Committee

FIFTH ANNUAL FORUM ON FEDERAL INFORMATION POLICIES

THE IMPACT ON COMPETITIVENESS

A Summary of Proceedings
Prepared by
Douglas C. Brooks

Library of Congress Washington 1988

James P. Riley, executive director of the Federal Library and Information Center Committee (FLICC) welcomed some 170 library and information center managers and others interested in federal information policies from the public and private sectors. The attendees and those on the program brought to the forum varied experiences in information technology and diverse opinions on the state of federal information policies as it relates to aiding United States competitiveness in industrial and information markets at home and abroad.

Riley introduced Dr. James H. Billington, The Librarian of Congress and chairman of FLICC. Billington, who assumed his position on September 14, 1987, is the thirteenth Librarian since the Library of Congress was founded in 1800.

The Librarian of Congress

Billington noted that competitiveness, such as that to be explored in the forum, is part of a broader competition of ideas and the spread of knowledge in which no one is ultimately the loser. The spread and dissemination of knowledge, the distillation of information into knowledge, and the development—by contact with knowledge—of wisdom, which is a characteristic of people, is very much a part of our civilization.

The concept that people could have enough knowledge to govern themselves without a mysterious omnipotent authority to rule over them was such an arresting idea 200 years ago, it was probably not entirely accidental that the Continental Congress in Philadelphia, and later the real Congress in New York, first met in buildings housing libraries. And when Congress established our free self-governing Republic under a new Constitution, one of its early actions was to build the Library of Congress.

The Keynoter

The keynote statement was presented by New York Congressman Sherwood Boehlert. Boehlert is the ranking Republican on the House Science, Research, and Technology Subcommittee, serves on the House Public Works and Transportation Committee, and is a member of the Select Committee on Aging. His continuing emphasis in Con-

gress is on "the three E's"—economic development, education, and the environment. Boehlert supports stronger civilian research programs, the adoption by United States industry of new technology, development of supercomputer centers in our institutions of higher education, and the upgrading of mathematics and science curriculums in our schools.

In considering the subject of the forum, Boehlert was impressed that almost no one in government talks about information policy and no one in government seems to *stop* talking about competitiveness. He considers that few leaders recognize the enormous role the federal government has played and must continue to play in the generation, collection, and dissemination of scientific and technical information (STI). As a result, information policy remains a piecemeal, half-hearted creature.

Why isn't there more demand from the private sector for domestic and foreign STI? Why do the Japanese make greater use of U.S. technical literature than we do? Why do universities and laboratories often find it easier to attract foreign corporate partners than U.S. firms? In the congressman's opinion, we pretend we do not need help from abroad, but the myth of U.S. self-reliance and invincibility does not track with history. We have always acquired technology from abroad, first, through British know-how and then, over the years, through immigration.

Boehlert considers a central repository and clearinghouse of STI, such as the National Technical Information Service (NTIS), essential in providing information to business at a reasonable price. In his opinion, the "inane" proposal to privatize NTIS is contrary to numerous studies which determined that the agency should remain with the government. The pending Trade Bill contains a provision, approved by both the House and the Senate, which would block the contracting out of NTIS functions. In a recent hearing on the matter, Boehlert said, "The folks who proposed privatization will have to be disabused of their notion that obsession is nine-tenths of the law."

To move forward, other approaches are necessary, he said. One bill, H.R. 2159, would turn NTIS into a government corporation, enabling it to in-

vest in capital improvements. Another bill, H.R. 1615, would merge current, diffuse government information apparatus into a single government information agency. These bills will be considered further when the privatization issue is settled.

Hearings also are to be held on implementation of the Japanese Technical Literature Act of 1986. Under that law, the Department of Commerce is to monitor Japanese technical activities and to acquire and translate Japanese documents. NTIS has increased its indexing of Japanese materials and recently published the *1987 Directory of Japanese Technical Resources*.

"But a greater effort is needed," Boehlert said. "In 1981, 81 percent of Japan's scientific and technical journals were not covered by Western language indexes. I doubt the percentage is much lower now." The language barrier is an impediment, he emphasized. Few U.S. students are learning any foreign languages; fewer still are learning Japanese. The secretary of education and the director of the National Science Foundation (NSF) should bring attention to this glaring deficiency. The Trade Bill would authorize grants to encourage school districts to offer language courses. He encouraged NSF to consider language study fellowships. NSF has already established an office in Japan and has a $4.4 million program to enable Americans to conduct research in Japanese laboratories.

Boehlert pointed out that not all technological expertise resides in East Asia. The Technology Transfer Act of 1986 and President Ronald Reagan's subsequent Executive Order of April 10, 1987, *Facilitating Access to Science and Technology*, direct all federal agencies and national laboratories to work with U.S. business. Implementation has been disappointingly slow in his view.

The Trade Bill would also create new technology transfer programs, aid state technology extension programs, and establish "regional centers for the transfer of manufacturing technology." It would also set up within the Office of Productivity, Technology Innovation (OPTI), a clearinghouse on state and local initiatives.

Boehlert said that at the same time these efforts have been underway to expand access to information, a contradictory policy has been pursued. The

administration has sought to stanch the flow of information citing the protection of national security as its motivation. Examples are the withdrawal of papers on unclassified photo-optics research at conferences in 1982 and 1985. Some research needs to be protected, but when the "concern for national security" becomes unbridled, we suffer, he said. Numerous politically balanced panels have concluded that we gain more from open access to scientific literature than do our enemies.

Now, concern about commercial, not military, competition causes debate about the free flow of information to erupt again. The President has announced that he will send legislation to Congress limiting the release of information on superconductors. This was first mentioned in a speech last July, in which he recommended "authorizing federal agencies to withhold from release under the Freedom of Information Act commercially valuable scientific and technical information generated in government-owned and operated laboratories that, if released, will harm U.S. competitiveness."

Boehlert thinks the statement covers a broad, ill-defined category of information and feels we should be careful about limiting discussion of a technology that owes as much to developments in Zurich and Tokyo as to those in Houston.

There seems to be a new element in American economic policy—fear. The congressman asked whether we have become so insecure about our abilities that we believe we can only stay ahead by guarding our discoveries. Have we reverted to the "infant industry" stage of development in which protectionism is viewed, rightly or wrongly, as the only way to build an economic foundation? On the one hand, we deride our competitors as uninventive followers; on the other hand, we fear they will destroy our economy with their inventiveness. There are patents and trade secrets, of course. However, before we expand the definition of protected information, we should consider the implications. Boehlert concluded with a call for the creation of some central structure in government for the review of information policy.

The Impact of Current Policies on Economic Competitiveness

Dr. Richard Rowberg, chief, Science Policy Research Division, Congressional Research Service (CRS), Library of Congress, presided over the morning panel. In introducing the morning session, which focused on the collection and dissemination of foreign science and technical information (STI), Rowberg observed that issues such as national security have received primary attention. However, it is becoming clear that the acquisition and use of such information is increasingly important to our economic future. He stated that the key to a healthy, growing economy is to increase productivity in manufacturing and in the supply of services. Further, a fundamental factor in improving productivity is technological development—the economic exploitation of discoveries in science and engineering and developments in those fields. The diffusion of STI into the economies of the world requires a steady flow of information, he said.

Until recently, most of our policies and debates on information flow have centered on controlling or limiting access to our own information. Although our intelligence community and research libraries devote much time and effort to collecting and analyzing foreign STI, there is little emphasis on how that information can help U.S. economic development. Increasing attention to the issue is indicated by the President's Executive Order of April 10, 1987, facilitating access to STI, the Japanese Technical Literature Act, and growing concern in Congress for the state of our national economic and technological competitiveness.

STI and Competitiveness Issues

Rowberg introduced the first panelist of the morning session, Dr. Christopher T. Hill, senior specialist in Science and Technology Policy, CRS. Hill said, "A nation and its industry are said to be competitive if they are able to produce goods and services and sell them in domestic and international markets while maintaining an acceptable and improving standard of living for the citizenry." This definition ties a nation and its industry closely together and emphasizes being com-

petitive in both export and domestic markets.

Among the indicators of declining U.S. competitiveness, Hill said, are our balance-of-payments situation and high federal deficit. In addition, after years of more or less continual economic growth, the standard of living has not improved appreciably for the average American family since the early 1970s. The productivity of U.S. workers has grown much more slowly in the last fifteen years than in prior decades, and there has been a decline in the perception of the quality and desirability of U.S.-made products in world markets, he said.

The share of U.S. patents awarded to Americans has fallen, and we have patented less in foreign countries. While we remain relatively strong in such areas as total research and development spending and winning Nobel prizes, Hill said, other nations are taking the lead in space exploration and exploitation, optoelectronics, and perhaps, high-temperature superconductivity.

Many actions can improve our competitiveness with other nations. Hill outlined three specific issues regarding federal information policy and U.S. competitiveness.

The first is how best to serve the private- sector demand for technical information. Companies are rapidly moving from technical self-sufficiency to mutual interdependence, and the hottest things going in the world of industrial technology today are strategic alliances. Such alliances may involve competing firms or firms in unrelated industries; some connect firms with universities or federal research laboratories. Many cross national boundaries. For instance, a recent study found that nearly all the major producers of computer chips are involved in joint technology agreements with companies in Japan, Korea, or the Netherlands.

Added to this increased interest in external research, industry has a new interest in external sources of STI and in the effective acquisition of such information by their companies. This can mean new levels and types of demands on federal information resources.

What is the role of government in this change of corporate technology development? Hill cited four developments of interest: passage of the National Cooperative R&D Act in 1984 lessening

antitrust barriers to cooperative research and development among competitors; the Stevenson-Wydler Technology Innovation Act of 1980 and its amendment, the Federal Technology Transfer Act of 1986, making technologies developed in federal laboratories more available for exploitation in the private sector; seed funding providing for centers of industrial technology to be housed at universities; and the Japanese Technical Literature Act in 1986, giving the Department of Commerce the authority to acquire, translate, and disseminate technical literature and information from Japan.

Unanswered questions regarding these initiatives remain, and some feel many opportunities are still to be explored. In managing the federal information resource, the questions concern improving the availability of STI to industry, as well as restricting its availability to competitors abroad.

Hill's second issue for discussion was making the federal information resource obtainable directly for application by industry. This has created a conflict over determining the federal role in adding value to technical information prior to transferring it to users. Under its view that the government should minimize its role in providing services and goods that might otherwise be provided by the private sector, the Reagan administration has sought to privatize the National Technical Information Service. At NTIS, the value added to information products is limited largely to locating and duplicating government-owned documents and selling them at cost.

At the same time, the administration has strongly advocated opening federal research laboratories to collaboration with industry and universities. It has implemented and supported the system of technology transfer agents required under Stevenson-Wydler. It could be argued that this process adds considerably more value to federally owned research on a proportional basis than does NTIS.

Other actions to make federal technical information available to industry on a value-added basis include passage of the Federal Technology Transfer Act and the promulgation in April 1987 of Executive Order 12591 on *Facilitating Access to Science and Technology*. The order, which imple-

ments the Technology Transfer Act, goes beyond it in several ways. Late last year Congress appropriated several million dollars to etablish Regional Centers for the Transfer of Manufacturing Technology that will transfer technology developed in the Advanced Manufacturing Research Facility at the National Bureau of Standards (NBS) to small and medium-sized firms. The government also continues to support the agricultural extension system, which has served U.S. farmers and other agricultural interests with research and technology transfer for many years.

The third issue relates to restricting foreign access to federal technical information resources. In a recent *Atlantic* article, Robert Reich wrote of "techno-nationalism." He reported a growing belief that U.S. technology should be kept from foreigners, not just for national security but also for reasons of economic competitiveness. Reich contrasted that view with "techno-globalism" which recognizes the global scope of new technology and the challenge to manage the resource on a global basis.

An inconsistency exists between the current behavior of U.S. industry, which seeks to form alliances throughout the world, and the current posture of the U.S. government, which seeks to enhance the competitiveness of U.S. firms vis-a-vis foreign competitors.

The Federal Technology Transfer Act of 1986 contains a provision directing federal laboratories to give preference to firms that agree to manufacture any resulting product in the United States when entering into cooperative research and development agreements with industry. Such a concept had not been made explicit in such broad law previously.

The sections of the pending Omnibus Trade and Competitiveness Act on research, technology development, and technology transfer contain many references to giving preference to domestic firms. SEMATECH, the industry-based Semiconductor Manufacturing Technology initiative, which received $100 million in federal funds in FY 1988, is to be limited to domestic firms as participants.

Last July, foreign scientists, business people, and diplomats (but not foreign press) were barred

from a national conference on the new high-temperature superconductors. The conference was sponsored by the White House Office of Science and Technology Policy (OSTP), the Department of Energy (DOE), and the Department of Commerce.

In the new superconductivity initiative sent to Congress recently, the President proposes amending the Freedom of Information Act to create a new exemption to the release of federal technical information to requesters if it might cause harm to the economic competitiveness of the United States.

Even as the OSTP has sought to limit foreign access to U.S. technical information, it has been pressuring the Japanese to open their government laboratories, cooperative R&D ventures, and industrial employment to participation by more Americans and U.S. companies. What is unclear at this point is how the kinds of restrictions on international technology now being discussed in the United States might affect our access to foreign sources of STI in the future.

In conclusion, Hill called attention to the work ahead in establishing effective relationships among government sources of technical information and know-how and those private firms in the best position to use it for economic gain. The current debate over the government's role as an information provider, especially in value-added form, while timely, may be inhibiting response to the new international competitive environment. A big unknown is the extent to which "economic security controls" imposed on technical information in the name of protecting competitiveness may, like some "national security controls" in a different arena, arguably become barriers to the internal dynamism needed to cope with the challenge of the new economic competition into the twenty-first century.

Acquisition and Use of Foreign STI

Barry C. Beringer, associate under secretary for economic affairs, Department of Commerce, discussed the role of the Department of Commerce in increased federal government efforts to acquire and disseminate foreign information, particularly Japanese information. The department's National Technical Information Service is now actively involved in acquiring foreign-source technical

information and serves as a clearinghouse for U.S. government sponsored research and technical reports.

Beringer spoke of recent activities relating to information policy—twelve conferences or hearings in the last six years on access to information on Japanese science and technology. Two hearings led to enactment of the Japanese Technical Literature Act of 1986. Impetus for the action was the loss of markets to Japan, now an innovator in developing commercially applicable technologies. Much of Japan's success is thought due to its diligent pursuit of information and know-how from foreign sources, especially the United States. It has recently shed its "copycat" image by moving into areas of true scientific and technological innovation.

Information users were conspicuously absent at the hearings and conferences. There was no clear sense of what the demand is for Japanese technical information. Consequently, the department has initiated a survey of U.S. industry needs for such literature in the specific field of advanced ceramics. The U.S. is yet very competitive with the Japanese in this field, Beringer pointed out. It is an area of wide R&D effort by many U.S. laboratories in government and industry, he said. The ceramics survey will be a base for extending the surveys to other technical fields. Industry workshops are planned for fall 1988.

Presently, the approach to implementing the Japanese Technical Literature Act is for the Office of Japanese Technical Literature to increase awareness of existing resources for such information, to provide appropriate information where gaps exist, and to coordinate current federal efforts to avoid duplication. With the cooperation of NTIS, a directory has been produced. It lists programs and services in the U.S. that abstract, translate, and disseminate Japanese technical literature, all Japanese translations done by the federal government in the last year, and case studies of successful U.S. company efforts to acquire and utilize Japanese information.

Reports are also published on key high technology developments in Japan. One on advanced ceramics is now available through NTIS. One on flexible manufacturing systems will be released

shortly. Possible reports for 1988 include biotechnology, heating and air conditioning technology, and optoelectronics.

A report prepared for Congress on current federal government activities to acquire, translate, abstract, and disseminate Japanese technical literature shows a significant level of activity in the Department of Commerce, the Department of Defense (DOD), Department of Energy (DOE), the National Aeronautics and Space Administration (NASA), and NSF. Some duplication exists. Following congressional review, the report will be available to the public through NTIS.

To increase awareness of information resources within the government and foster increased cooperation, the Department of Commerce and the Office of Naval Research will cosponsor an April 22 workshop on "High Tech Materials—State of the Art in Japan." The Department of Commerce is also a participant in the Japan Technology Evaluation Program (J-TECH) sponsored by the National Science Foundation and the Defense Advanced Research Project Agency (DARPA).

Publication of a newsletter containing information on ongoing activities of the Office of Japanese Technical Literature and related government efforts has been initiated. It will also feature highlights of important Japanese scientific and technical trends, which the staff consistently monitors.

Beringer sees his role as one of cheerleader and one who ensures that existing resources of government-sponsored Japanese technical literature searches are made widely available to industry. For example, when the report on flexible manufacturing systems is available, he will ensure that the relevant government entities and interested industries meet. This is a good method of technology transfer, since translation of Japanese technical documents is time consuming and expensive.

The U.S. is at an early stage in tracking information from foreign sources, while Japan has been acquiring and assimilating foreign information for centuries. Its present economic success is at least in part due to this trait, he said.

Beringer considers it unfortunate that Japanese commercial ascendance has outdistanced its status as a responsible player in the international political and economic arenas. The Japanese are

preoccupied with "internationalization"; we might do well to adopt the same theme as part of our own preoccupation with competitiveness outside U.S. borders, he suggested.

An Interagency Working Group reports that progress is being made under the Technology Transfer Act. It has found that there are now more than 100 projects at our labs in cooperation with U.S. industry. These are now in place or being put in place.

Beringer concluded that we are now in a different world economy, a competitive world economy. Before, we could publish the results of our information and our research and we would be the only people capable of taking advantage of it. Today that is not the case. Consequently, we must change the level of awareness in federal labs, federal libraries, and federal information centers to take into account the competitive implications of each publication, of each patent, and each bit of technical information we disseminate.

NSF and International STI Transfer

Speaking next was Charles T. Owens, head, Information and Analysis Section, Division of International Programs of the National Science Foundation (NSF). He reviewed some of the recent testimony of Dr. John Moore, NSF's deputy director, who chaired the Working Group on International Education, Infrastructure, and Facilities of the Committee on International Science, Engineering, and Technology (CISET) of the Federal Coordinating Council on Science, Engineering, and Technology (FCCSET). Initial recommendations of the group emphasized that much information on international STI developments is available, and an important task is to assess and analyze it for U.S. users.

In 1986, NSF cosponsored with the Office of Naval Research a workshop on "Monitoring Foreign Science and Technology for Enhanced International Competitiveness: Defining U.S. Needs." Included in their tentative conclusions, which were generally consistent with the views expressed by the CISET working group, were the points that:

- information products must be well targeted to users;

- there is no overall inventory of sources of federally held information on foreign STI;
- timeliness of information is critical;
- government seed money and feasibility studies for new information and dissemination services to monitor foreign research should be pursued;
- considerable potential exists for expanded government partnerships with private-sector providers and users, and government as a prime user of information, can be a stronger coordinator;
- Executive Order 12591 issued by the President in April 1987 directs NSF, together with State and Commerce, to develop "a central mechanism for the prompt and efficient dissemination of science and technology information developed abroad to users in federal laboratories, academic institutions, and the private sector on a fee-for-service basis." Since neither NSF nor State has an established mechanism for collecting fees, NTIS will likely be suggested for that role. The NSF Information and Analysis Section is responsible for collecting, analyzing, reporting on, and disseminating information to NSF, other agencies, and the U.S. scientific and engineering community in academia and industry. Products are made available electronically and in hard copy. An int-science index by discipline and subject dated March 1, 1988, is obtainable from the section. It indexes all documents contained in the online information service.

In addition, Owens pointed out, offices in Tokyo and Paris monitor STI in their regions. Reports are available containing information on Japanese STI matters and on work underway in Japanese laboratories.

Last December, NSF, State, and Commerce launched a six-month pilot study to determine effective methods for transferring unclassified information on foreign STI to the nation's academic and private research communities. Research topics of special focus in the project include superconductivity, advanced ceramics and microelectronics. Primary sources of information are Department of State overseas science attachés and NSF staff. Reports have also been requested from the National Bureau of Standards, the National Institutes of Health, the Office of Naval

Research, the Air Force Office of Science Research, and NASA.

Information is being provided to a targeted user group from universities, industry, and federal research laboratories. Users will provide continuous feedback on the quality and substance of the information, suggest improvements, and evaluate the service at the end of the study. After the final evaluation, the sponsoring agencies expect to have a better grasp of what kind of users are interested in what aspects of foreign STI, in what format, and at what cost.

In the next few months, Owens hopes to expand the scope of the online service on foreign STI to reach all U.S. scientists and engineers with access to the network. Some possibilities for doing this are:

- use Arapanet or Bitnet as links from the in-house system;
- use an "info-server" system through which researchers can electronically request reports on a specific topic and country and receive the reports online overnight;
- use a commercial service to store the reports, making them available to the widest possible scientific audience and administer a payment system.

NSF is sponsoring "survey visits" by U.S. scientists and engineers to foreign centers of excellence. One survey visit will focus on Japanese research on stabilizing a building's base so as to isolate it from earthquake tremors (a seismic base isolation).

A series of questions must still be answered. What role is best for the government in translating current materials? How can maximum exposure be provided for translations of copyrighted reports and articles? What is the value of reports on STI policy matters as opposed to those on technical developments? Does the federal government have the same potential ability to assist both industrial giants and small start-up firms in biotechnology or high-temperature superconductivity?

The NSF mission encompasses primarily *basic* science and engineering research, rather than applied, so its tie-line to future commercialization of technologies and associated economic preeminence is indeed long-term. The pilot study under-

way is a critical investment in a long-term strategy that must be fed from the fundamental end of the research pipeline in order to produce a yield later.

A Behavioral Scientist's Viewpoint

The final speaker of the morning was Dr. Michael Maccoby who directs the Project on Technology, Work, and Character in Washington, D.C., as well as the Program on Technology, Public Policy, and Human Development at the John F. Kennedy School of Government, Harvard University.

As a social behavioral scientist, Maccoby approached the subject from a somewhat different focus than the other speakers. He first gave a broader context to the meaning of competitiveness; second, he discussed the role of government; third, he asked what kind of information is needed; fourth, he asked what blocks the use of available information; and, fifth, he asked what we must do about it.

- Regarding the first issue, Maccoby suggested that we think of competitiveness not just in terms of the success of companies and industrial sectors nor in terms of the standard of living, but more precisely in terms of employment, the nature of good jobs, and the effects on regional and global context. As low-wage-rate production leaves the U.S., competitiveness means value-added production, continual innovation, and use of new technology, cutting costs, improving quality, shorter product cycles, and more customization. For the country as a whole, it means developing our human resources, education, retraining, and understanding the relationship of competitiveness to national security.
- Maccoby suggested that government needs information for four reasons: decision making, scanning for early warning of problems, providing essential information to companies not capable of acquiring it for themselves, and planning for the future.

Congress is constantly pressured to support interest groups and government policies for acquiring, disseminating, and restricting information and tends to support these interests. What Congress needs is disinterested expert analysis which legitimates knowledge in terms of its accuracy and relevance so that decisions can be made in the national interest.

Short-term advantage such as gaining protection from competition leads to long-term disadvantage because, as long as it is protected, industry does not take sufficient steps to become more competitive. The problem, as Maccoby sees it, is a tendency by policymakers to work for purely macroeconomic solutions on the national level when, in fact, competitiveness requires a balance of macroeconomic and microeconomic approaches in both the public and the private sectors. Policymakers need to revise information management policies because the information most useful in formulating public policy may also be that which is most closely held by those who seek to exploit it for competitive advantage, or to conceal disadvantageous weaknesses. Our laws tend to protect such uses in the name of privacy, free enterprise, or even national security, he said.

Competitiveness ultimately depends on the quality of the nation's education and infrastructure. We lack a national system to match people with jobs, and to retrain for internationally competitive industries. Scanning for early warnings of problems and providing information to companies requires not only mechanisms to gain and analyze information but also to ensure it is used and communicated. Outreach programs of the kind heard of from NSF are exactly what is needed. Finally, Maccoby emphasized, we give insufficient attention to future analysis. Sweden has a futures group inside the prime minister's office.

- The third consideration is the kind of information that will help. As noted earlier, information alone is overwhelming. We need to understand the meaning of information, and we need to focus on the user. Seven kinds of knowledge are needed: knowledge of the development of products, processes and materials; knowledge of developments in organization and management; knowledge of strategies used by competitors; knowledge of foreign government policies that support competitors; knowledge of the overall economic resources that circumscribe the first four; knowledge of the relationship of U.S. economic strategies to those of other countries, and knowledge of how economic strategies affect

national security interests.

• Maccoby's fourth concern was for factors that block U.S. industry from gaining and using available knowledge. He believes our psychology, rather than access, keeps us from learning. In 1980, a Japanese agency published a ten-year plan outlining the secret of Japanese success: continual learning, labor-management cooperation, and equity in rewards. Maccoby believes we suffer in the U.S. from both turfism and arrogance. In large U.S. companies, the notion of "not invented here" is a problem. We are used to being number one and exporting our technology with the idea that our foreign competitors could not use it anyway. The opposite situation now exists. In many cases, our foreign competitors show us technology that we cannot copy. Further, Maccoby asserts, neither engineers nor managers read a lot. Their focus is on action. We find it hard to believe that the Japanese or Europeans are out-competing us due to a better approach. We want to believe it is due to unfair practices or special support from governments.

An important aspect of our lack of making use of information is our outmoded view of technology and its use. U.S. managers tend to think in terms of "great leaps" not incremental steps, while our Japanese and German competitors tend to balance the two. The history of development in steel and oil refining shows that returns on incremental improvements pay off. Great leaps alone are not enough to maintain competitiveness. In Japan, incremental steps are made not only by scientists and engineers but also by ordinary workers through quality circles. Maccoby referred to an article in that day's *New York Times* [March 7] indicating that Japan has been achieving a level of innovation greater than that of the United States. The assertion was based on a technique for analyzing the quality of patents. He feels that this study helps shoot down our final conceit that the Japanese are copycats and not innovative.

American managers often think erroneously of technology as a substitute for expensive labor, not a tool that trained workers must use to improve quality and efficiency. As an example, compare the successful General Motors-Toyota joint venture with a few robots that produced some of the

highest quality cars in GM, to the totally automated GM plant, which was a failure.

To better use information for competitiveness, American managers must, in many cases, change their thinking about using that information and about who should be empowered to use it. We must change our whole idea of investments to emphasize investing in people for quality and productivity. The most knowledgeable managers say it is easier to get any technology than to use it competitively.

In concluding, Maccoby said, "The bad news is, as a society we must recognize overall that we have to change our approach to organization and management. The approaches to competitiveness that served us well are outmoded. We must swallow our pride and become more of a learning society. The good news is that a number of our leading companies have understood this and begun the process of change."

In a question-answer period at the end of the morning session, Maccoby commented that he thinks the Japanese are much more competitive than we think. We put too much weight on the supposed "culture" aspects of Japanese cooperation. The Japanese cooperate because they are evaluated on it, their raises and bonuses are based on it, and part of their salary is based on how much they teach other people.

Development of Policies to Enhance Competitiveness of the U.S. Information Product

Robert Simons presided over the afternoon session. Simons is director of International Affairs and general counsel of DIALOG Information Services, Inc. In setting the stage for the afternoon session, he suggested taking a look at the U.S. in the area of information products and competition, past, present, and future. He posed an opening threshold question: Is America losing its competitive edge in the marketing and export of information products and services? Issues related to the question include public and private cooperation, federal government policymaking or absence thereof, privatization of U.S. national resources, and foreign ownership of information companies.

A definition of information products, he said, includes information services and may also be termed recorded knowledge. Last year, Senator Albert Gore, Jr. (D., Tenn.) pointed out that the U.S. system was founded with the realization that one of our most valuable assets is the mind of each individual citizen. In the early 1960s, there were always two key questions to pose when contemplating an information search: Does it exist, and where can I find it? This was pre-NTIS. We have changed a great deal since then.

Simons then discussed how we achieved a role of leadership. A number of components were involved: computer technology, abstracting and indexing organizations, and open access to information. Government agencies showed an early awareness of the critical nature of information storage and retrieval and recognized a potential market for application of the new technologies.

Where are we today? There are now more than 2,900 commercial databases; the U.S. generating a little more than 1,600 with foreign countries generating the balance. There are 500 services around the world that permit access to databases; the U.S. has about 330. In sales volume, U.S. firms have revenues of $3.7 billion annually compared to $1.1 billion for foreign firms. The U.S. is clearly the leader, but the rest of the world has seen the potential and is attempting to catch up. There is also a recognition of the information repository role. Clearly, there is a favorable balance of trade in the industry.

What about the future? In the private sector, vertical integration could lead to information monopolies. Concern is present over the potential for privatization of government repositories. In the government sector also, there is continuing debate over sensitive but unclassified information confusing the users of information. Also, there is no cohesive government policy based on a specific strategy of support to the U.S. information industry. This lack has helped to create the impression that the U.S. is an unreliable trading partner. Debates on privatization and protectionism may tend to foster trade wars. There are also concerns generated by the Federal Bureau of Investigation (FBI) library awareness program and NASA's "no-no" list which raise fundamental questions as

to whether the U.S. will remain an open society.

Finally, Simons called attention to new threats and increases in document access fees that could adversely affect the market for information products and services. Although the U.S. has a tremendous history of innovation and global leadership in information products and services, we have to realize that the rest of the world is catching up with us.

Libraries as Information Providers

The first afternoon speaker was Dr. Peter Hernon, professor, Graduate School of Library and Information Science, Simmons College, Boston. He indicated that he would raise issues but also would try to place libraries in a much broader context than they are traditionally perceived. Implicit in the formulation of national information policy should be the marriage of all information resources, government and non-government. The presumption is that those gathering information should have access to all *available* information. It should not matter who produced the information, Hernon said.

Public information encompasses that which a federal agency chooses to impart on its own or the courts force it to release. Private information is intended solely for internal, not public use. Availability of information falling between the two categories is determined through "safety nets" such as the Freedom of Information Act and judicial review. A safety net is defined as a set of government information transfer mechanisms guaranteeing a *minimum* level of access to government information upon request. Depository libraries and federal information centers are also safety nets, but to public information.

Hernon stated that existing research suggests that the Internal Revenue Service (IRS) may have a 22 percent accuracy rate for the information conveyed over its toll-free telephone lines; depository libraries have about a 55 percent correct answer rate for factual and bibliographic questions; and federal information centers perhaps answer accurately 25 percent of their factual questions.

The collection, distribution, and dissemination of government information operate within a decentralized environment with the information

existing in different formats (paper copy, microform, machine-readable, and electronic). It might also be conveyed orally. Availability of government information is not synonymous with use, and use is not the same as impact. A central question is how to gain ready access to those information resources that will be used and have an impact.

The availability of information does not necessarily result in use and improved U.S. competitiveness. Information varies significantly in quality, currentness, utility, the containment of new ideas, knowledge, and other factors. Many barriers block access to available information, and various providers offer only segments of information.

Individual information-gathering behavior, preferences, and biases are keys to the resolution of information needs. Any access mechanism that fails to address such constraints may be underutilized. Hernon emphasized that we must better understand information-gathering behavior and the values attached to different information resources. Information systems must be molded to fit the expectations of users, not vice-versa.

Many questions need answering if libraries and other information providers are to guard against information overload and provide the information having the greatest opportunity to foster competitiveness. Libraries and information centers serve as links to other information providers. They select resources that meet missions and goals of the organization and users' short-term and long-range information needs. They must balance different needs and plan collections while addressing practical constraints such as budget size. *Professional* judgments, assessments, expertise, and management are required.

Hernon suggested that the contracting out of federal libraries may impede or injure U.S. competitiveness and the ability of libraries to meet expectations of host agencies for the provision of high quality and appropriate collections and services. Contracting out may not be the economic boon envisioned by the Office of Personnel Management (OPM) and the Office of Management and Budget (OMB). Another important question is whether the government should contract out

strategic components of its information structure while there are serious concerns about technology transfer in the world marketplace.

In spite of substantial opposition, the Department of Commerce and OMB continue their efforts to privatize NTIS. NTIS, or whatever the future alternative is, must maintain archival holdings and encourage the collection and retention of technical report literature on a broad scale. Hernon is concerned that the administration has not viewed NTIS within the larger environment, the array of providers of STI, and the impact of privatization on access to STI, in general.

In closing, Hernon stressed that federal information policy remains piecemeal and, at times, incorrect, contradictory, confusing, simplistic, and based on faulty premises. Before creating or implementing new federal policies relating to competitiveness, research should investigate interrelationships among the "safety nets" for the provision of information. Before attempting to identify more source material, we should more fully investigate issues related to information value, use, and impact.

Policymakers, he believes, should concentrate on the concept of a safety net, the interrelationships among information providers, and mechanisms that will stimulate greater use or specific types of information. A better understanding of safety nets—their roles, benefits, capabilities, and effectiveness—is needed to ensure that important information will be brought under bibliographic control and distributed/disseminated to scientists and others. Significant policy issues remain to be resolved. OMB Circular A-130, *Management of Federal Information Resources*, does not provide a sufficient foundation from which to build a dynamic, adequate, and rational policy framework for the future.

Democratization of Information Access

The second speaker of the afternoon was Marvin I. Weinberger, senior vice-president for marketing and corporate development of Telebase Systems, Inc. He advised that his presentation would be in three parts: an introduction to Telebase, a glimpse into the information future, and some concise recommendations for federal

information policies to support that future.

In Weinberger's opinion, we are engaged in a revolutionary activity as plans made in meetings such as this will forever change the way millions of people think about and use information. He considers it more than a revolution, more like a "singularity" in human history. A singularity is irreversible and profound in impact. We have, he said, experienced six singularities to date: the discovery of fire, agriculture, organized warfare, the written word, the scientific method, and space travel. We are a part of a movement that is bringing about a seventh singularity, namely, the complete democratization of information access.

Telebase Systems, an international knowledge gateway company, provides uniform and simplified electronic access to the world's information. The service is known as EasyNet and has connections to over 800 databases. In 1987, the firm was given the prestigious Information Product of the Year Award by the European Association of Information Services (EUSIDIC).

In advancing predictions of major trends in gateway developments over the next five years, Weinberger commented on H.G. Wells' speech in 1936 which talked of a world encyclopedia which comes very close to a conceptual blueprint of what we are trying to accomplish today.

Trends in underlying information indicate an explosion in the availability of databases to serve an increasingly broad but also diverse culture base. Many will be the products of small cottage-industry publishers. In the area of networking, worldwide communication transport will become fast, plentiful, and very, very cheap, he said. Networks will link gateways to the host and one gateway to another. End-users are coming to demand simultaneous and instantaneous response from database access networks, just as they enjoy immediate response when they pick up the telephone.

In the area of value-added intelligence, there will be substantial advances in incremental parsing of end-user search queries. Weinberger predicts the launch of the first metabases, which facilitate the pre- and post-processing of searches, and other expert systems that will begin to work *magic* in facilitating database searches and help

users cope with information overloads. Weinberger sees the evolution of increasingly individualized user interfaces serving horizontal as well as vertical national audiences.

The final trend discussed was in the area of business. Gateway codes of practice will be developed, and streamlining of contractual relationships among the parties in the chain of information delivery will occur. End-user billing and pricing will become further simplified and standardized, and prices *will* go down. Nontraditional players such as banks and phone companies will enter the arena helping to create a truly democratic worldwide market.

In commenting on needed federal information policies, Weinberger indicated that the federal government must give priority to the critical importance of the burgeoning information economy. Federal policymakers must help foster the evaluation of various alternative futures to develop a concise mission statement for the United States. Without such a focus, we will flounder in the face of highly targeted strategies being executed by other countries, he warned.

Deregulation is sweeping the telecommunication world overseas. Giant postal telegraph and telecommunications agencies (PTTs) like British Telecom and Japan's Nippon Telegraph and Telephone Company are using their immense financial clout to cause the information world to dance to their tune and to serve their respective interests. Before America's information business has been sold to the rest of the world, we must free our domestic equivalents of the PTTs, the regional Bell operating companies. They could then provide U.S. companies with the economic support needed to make innovation flourish, keep U.S. companies out of the hands of foreign business, and begin to provide an inexpensive and universal access to online services to our own populace.

The U.S. government once had a tradition of supporting information innovation. DIALOG is the world leader it is because the U. S. government once provided it support at a crucial point in its development. We must recommit to provide more than just lip service to such far reaching innovation in information technology. If we do not, the Japanese and Europeans deserve to

take away the U.S.'s technology lead. They are spending the dollars and we are not.

Finally, Weinberger called for vigilance in safeguarding the U.S.'s information democracy. We may have won the short-term battle against "sensitive but unclassified" regulations, but the war is not over. The democratization of access to online information must be so ingrained that it would be unthinkable for paranoid bureaucrats to try to limit such freedom, he said.

Competitiveness and Cooperation with Europe

Speaking next was Patrick Gibbins, managing director of Archetype Systems, Ltd., of London and former chairman, European Association of Information Services (EUSIDIC). Gibbins recalled the formation of EUSIDIC in 1970 by a small group of companies just starting to use scientific and technical information support in electronic form. Its membership includes both suppliers and representatives of user organizations, such as major libraries and corporate information centers. A pertinent activity now underway is an effort to develop guidelines and codes of practice to determine relationships among the various players in the complex world of information distribution. There are a number of associate members from the U.S. who are active participants in annual conferences.

Gibbins commented that while Europe has a population and industrial infrastructure comparable to the U.S., the similarity ends there. Europe is not a single market, but many markets fragmented by language, culture, and major administrative trade barriers. This is true even within the European Economic Community (EEC), and not until 1992 will the control over imports and exports among EEC countries be lifted.

The size of the European market for electronic information services is about a third to a quarter of the size of the U.S. market. However, the demand there is still following a steeper growth curve than that of the U.S., which over the last few years has shown signs of beginning to plateau. Europe, therefore, represents one of the largest export markets for the U.S. with between 35 and 40 percent of the demand for online access filled by U.S. service operators. By comparison, the U.S. probably imports no more than 1 percent of its online

requirements. Europeans consider this a substantial trade imbalance that they want to redress.

How did the U.S. achieve such a strong position in Europe? Gibbins attributes it to the U.S. being there first with online search services, and to the quality and range of the services available. A number of indigenous online services has started up in Europe over the last ten years, but has had little impact on the sales of U.S. services. The balance-of-trade picture, he said, must also show database publishing operations, and Europe has many successful ones. Three examples are Derwent's World Patent Index, the INSPEC database covering mathematics, physics, and electrical engineering, and PASCAL. Information from these sources is licensed to U.S. online operators and generates substantial revenues for them.

This worldwide distribution of European databases by U.S. operators is a fine example of partnership. Particularly in the areas of science, technology, and medicine, the distribution and use of information is a cooperative venture of the database publisher, the online distribution service, and the consumer, which might be an academic library or a corporate information center. This global partnership is the basic principle that has guided the dissemination of human knowledge from the great medieval libraries visited by monks as they travelled around the world, through the growth of print in the nineteenth and twentieth centuries, to our present world of global electronic communications.

Gibbins noted that protectionism is the enemy of partnership, and that the last few years have seen growth in protectionist attitudes on both sides of the Atlantic. He views the world's scholarly and industrial communities as frequently threatened by forces and practices formulated without an understanding of the essential nature of why human knowledge must be shared.

EUSIDIC has opposed the imposition of barriers to the free flow of information wherever they have been encountered. It has lobbied against European tariffs and regulations favoring European suppliers. An example is the European PTTs, which protect themselves wherever possible from any moves that they feel threaten their control over national monopolies.

Conversely, the position of U.S. information services in Europe has been damaged by the rising concern of European users about the U.S. government's attitude and policies applied by some U.S. information service suppliers. The concern stems from a fear of being denied access to information sources critical to many industries. It is also fueled by certain agencies in Europe that are happy to encourage paranoia to justify increased investments in creating "independent" national information sources. A French magazine, a couple of years ago, featured a headline, "U.S. Information Imperialism," which was extreme but illustrates some of the feeling.

Gibbins noted that there is something special about online as a medium for information delivery. Access can be controlled selectively through the use of passwords and control of networks. This cannot be applied to control of printed products. Some recent events seem to justify these concerns to some Europeans. In 1986, a Pentagon spokesperson stated that unclassified, privately owned databases would be reviewed for "recommendations regarding restrictions on access to such (sensitive) databases." Rumor had it that the FBI and the Central Intelligence Agency (CIA) visited online operators to study the problem.

Gibbins was delighted to read that the U.S. Computer Security Act of 1987 explicitly limits the DOD area of action to information that is clearly classified and affects national security. The Information Industry Association (IIA) here has worked very hard to oppose policies that might restrict the free flow of information. The famous NASA list referred to previously included a very large number of European organizations which suddenly found themselves no longer having access to information vital to their scientific research programs.

Commercial organizations are involved as well. Gibbins referred to news accounts that Dun and Bradstreet has a policy of not granting access to certain classes of information in their databases to certain types of organizations which were not, in their view, particularly friendly to their mainstream customers. These, and other similar incidents, need to be viewed through the eyes of a community on the other side of the Atlantic,

which is dependent for 40 percent of its information services from North America.

It is important to realize that it is not whether there is a deliberate policy to restrict European access to U.S. information sources, but that there is a perception that such policies could exist. Gibbins believes that the most important single act we could take to improve the competitiveness of U.S. information services in Europe would be to embark on a public relations program to reassure the European market that we value their business and that we view the United States and Europe as a partnership, not as just a one-way street.

In commenting on a number of acquisitions, in recent years, of U.S. companies by European interests, Gibbins suggested that we look at the motives behind these investments. The U.S. is the largest single market in the world for information. It would be difficult for any organization to formulate a long-term strategy without capturing at least a part of that market. The best way to enter this market is through the acquisition of an established U.S. company, but the last thing the buyer would want to do is to change the nature of that company. The mission of the company is to serve the U.S. market, and that is what the company would be expected to continue to do. He sees no real reason for concern about long-term danger to U.S. interests. Over the last three decades, Europe has successfully survived several waves of acquisitions by the U.S., Middle East interests and, more recently, the Japanese.

In closing, Gibbins said, "I view investments on an international scale as a positive thing. It helps cement relationships rather than divide them. In a sense, I think it is a move that the U.S. should actually welcome because I feel it brings the world closer together, and I believe that it can bring the U.S. closer to the rest of the world's information community."

Interrelationships of the World Economies

The final speaker of the forum was Dr. Herbert R. Brinberg, president and chief executive officer of Wolters Samsom U.S. Corporation. He began by quoting from a book written in 1967 by the French author J. J. Servan-Schreiber titled *The American Challenge* in which the author observed

that, " . . . the flood of American industrial power into Europe posed a grave problem for Europe." He referred to "the systematic and organized assistance the U.S. government gives to key industries" and was particularly concerned that American dominance was happening . . . through actual takeovers of European firms." Servan-Schreiber chided industry and government for their failure to take appropriate actions to maintain competitiveness.

Twenty years later we are reading about competitiveness concerns in our press, only this time the situation is reversed—foreign companies, it is feared, are taking over our country. Some pundits say that the tide will turn once again in the not too distant future as more and more U.S. companies adjust and industry begins to set the stage for a rebound.

October 19, 1987 (Black Monday) merely underscored the fact that the economies of the principal countries of the world are inextricably bound together, Brinberg said, and the reactions of one national economy to discordances in another are essentially of "real time" dimensions. Further evidence of interrelationships of the world economies is highlighted by Commerce statistics that showed that by the 3d quarter of 1987, direct investments in the U.S. by foreign companies reached $235 billion, and direct ownership by U.S. investors of foreign companies totaled $287 billion. The U.S. is still $50 billion ahead. Major U.S. companies are thriving in overseas markets, and we remain a significant investor in industries around the world.

Brinberg warned that we must not forget this as we consider appropriate actions to correct our current trade deficits. To the extent that we may take actions to preclude foreign-owned companies from participating in our domestic markets, retaliatory actions by foreign governments may cause even more severe damage to American owned companies abroad.

In Brinberg's opinion, the failure of our manufacturing industries to retain the competitive edge has been as much a result of our own smugness and shortsightedness as the deliberate trade policies of foreign governments or the trade practices of foreign-owned companies. While we were

ignoring our home-grown developments, the Japanese and Europeans studied our methods, adopted our technologies, absorbed our language, and beat us at our own game.

After repeated requests from Japanese industrialists after World War II, W. Edwards Deming, a New York University professor of statistics, taught and helped implement new organizational structures and quality control methodologies in Japan. Until recently, U.S. industry treated Deming with benign neglect. In 1960, Japan awarded him the Second Order Medal of the Sacred Treasure, the highest honor the country bestows on foreigners. It was twenty years later that our President awarded him the United States Medal of Technology for these same contributions.

The lack of a coherent national economic or trade policy has compounded our problems. The enormous federal deficits stimulated the consumer economy, forced interest rates up, increased the value of the dollar, and consequently attracted capital from overseas, stimulating imports. Then, actions to depress the dollar created a cheap foreign market for our goods and was an encouragement to foreign investors to buy our companies, including a number of information companies at bargain prices.

Motives for foreign investments in the U. S. reflect economic realities, just as economic realities prompt U.S. companies to continue to invest abroad. Foreign companies see great potential here for information products and services. They view our companies as the best to serve the world information-using community. U.S. -owned companies abroad have been contributors to the well-being of the host countries, and foreign-owned American companies are legitimate contributors to our well-being. Foreign ownership of U.S. information companies in no way inhibits the growth of our industry or compromises the quality or integrity of the products and services they provide the private sector or government.

Brinberg gave personal testimony to this from his experience when Aspen Systems Corporation, a subsidiary of American Can Company, was sold to the Wolters Samsom Group, headquartered in the Netherlands. Brinberg was vice president for corporate planning for American Can Company,

as well as chairman of Aspen Systems Corporation. He pointed out that its work product, strategies, policies, community responsibility, quality standards, market philosophy, employment and compensation practices, integrity, and leadership have remained intact. The company today is almost ten times larger now than it was before the purchase. He does not consider his experience unique. [Editor's note: Aspen is a firm that has successfully competed under OMB Circular A-76, *Performance of Commercial Activities*, under which it has operated federal libraries.]

Brinberg considers the presumption that foreign ownership of information can undermine our national security because valuable information resources—albeit nonsensitive and not secret—will be more readily available to foreign governments or competitors to be without foundation. The government has been scrupulous in establishing and maintaining the security of confidential, secret, or sensitive information. In contracting out, it still maintains controls and sets policies that govern information.

The foreign ownership issue has been injected into discussions concerning the merits of privatization, and, in particular, the privatization of NTIS. This is a domestic issue. It has to do with the President's policy to shrink the size of the federal government and to inject the competitive process as an agent of change. It is also a challenge to established government libraries and information centers to rethink their mission and their organization in the context of new information needs, sources, and technologies. After all, A-76 gives the government facility an opportunity to submit proposals, and there have been many instances in which the agency's proposal won.

National security is not the real issue with government libraries or with NTIS. All of the information housed in these facilities has been published or is in the public domain. NTIS has 158 agreements in 54 countries for the collection of scientific and technical information and collects such information from all available sources around the world.

Information exchange is a two-way street in the global economy. Each country must protect its truly secret and confidential information and

must provide for the protection of its intellectual work products, but it cannot build massive barriers to prevent the transborder flow of data. The U.S., he said, should promote the exchange of know-how and knowledge, just as we did in the era after Sputnik. We in the information world must absorb the lessons taught us by the experience of our manufacturing industries.

There is unanimous agreement that we *do not* need more information. What we *do* need is greater knowledge about information sources and their availability; more rapid access to information; better tools for the retrieval, management, integration, and communication of information; standards for hardware, software, and telecommunications; and open borders for the free flow of information.

The U. S. needs a national information policy, articulated by the President, supported by Congress, and guided by appropriate administrative leadership. Brinberg submitted that the principal programs of our national information policy must include:

- a long-range plan, and appropriate support, for development of a national communications network and standard protocols that are prerequisites for an information age economy;
- a long-range plan, and appropriate support and guidance, for the development of the increasingly powerful and sophisticated computers that can make the difference in scientific R&D and support of our major information resources;
- leadership in establishing software standards to improve the interchangeability of information and to bring the knowledge bases residing in many scattered reservoirs to the desktops of the users;
- support of R&D and pilot studies of new media for storage and dissemination, of new systems for information access, and of new methodologies in information management and information sciences;
- improvement in the location of and access to information here and abroad. NTIS, NSF, and Commerce's networks, in his opinion, are solid bases on which to build;
- promulgation of a coherent program for a true partnership of government and the private sector

in the development, organization, and dissemination of information;

- revision of the policies and statutes concerning proprietary rights and the regulations governing the Government Printing Office to reflect the new technologies for producing and delivering information;
- establishment of a trade policy for information flow across borders so that we can deal equitably with our trading partners.

Brinberg concluded, "In an information age, even more than in the industrial age, it is impossible to close the border to the movement of knowledge and know-how. It will find its way over and under and even invisibly through the barriers regardless of how solid or how sophisticated they may be. We are too smart and too inventive to repeat the mistakes of a bygone era."

In the question-answer period that followed, Brinberg was asked to comment on the relative ratio of U.S. information resources owned by foreign corporations versus foreign resources owned by U.S. companies. He indicated that foreign companies own far more U.S. resources than the other way around, basically because U.S. companies are not too interested in the very fragmented foreign markets.

Forum Call
1988

Information is arguably the greatest resource in the United States today. At the same time, the federal government is the biggest user of automated information systems in the world. The United States has established itself as the world's information leader in the evolving Age of Information.

In recent decades, there has been an erosion of America's overall industrial competitiveness as smokestack industries have migrated to Latin America and Asia. One is as likely to find "made in Mexico," or "Japan," or a host of other industrial foreign countries rather than "Made in the U.S.A." on the clothing one wears, the car one drives, the technological equipment one uses.

Congress, the administration, the media, and the public are now expressing concern that the United States is losing ground in world information and industrial markets.

Do federal information policies enhance or hurt U.S. competitiveness in world markets? This and other issues that relate to the impact of federal information policies on competitiveness were the focus of the fifth annual Forum on Federal Information Policies held in the Madison Memorial Building of the Library of Congress, on Monday, March 7, under the sponsorship of the Federal Library and Information Center Committee.

FLICC was established in 1965 (as the Federal Library Committee) to serve as a forum and to provide leadership when policy issues arise affecting the provision of information to government employees and the general public. It is in response to these pressing international issues and to our mandate that FLICC has arranged for this forum.